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EXAMINER	
FLETCHER III, WILLIAM P	

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 04/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/675,168	BHATTACHARYA ET AL.	
	Examiner	Art Unit	
	William P. Fletcher III	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-101* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-101* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claim 74 (p. 27, first instance) has been renumbered 73.***Specification***

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Claims 1 and 38 recite: "wherein the presence of said dried layer of adhesion promoter does not have a detrimental effect on the appearance of said subsequently applied coating material." Claim 74 recites: "wherein, due to the application of a substantially complete coating of said thermoplastic polyolefin element with said mixture and a reduction in the amount of foaming and splashing of said mixture that occurs during said application, the presence of said dried layer of adhesion promoter does not have a detrimental effect on the appearance of said subsequently applied coating material." While p. 11 of the spec. discloses that a lack of foaming prevents defects in the adhesion promoter layer, the spec. does not disclose prevention of defects in the subsequently applied coating material.

This application claims priority as a continuation of 09/577,776, the disclosure of which also fails to provide antecedent basis for these limitations. Consequently, the claims in the

instant application are not entitled to the earlier filing date of the '776 application. For the purpose of searching and evaluating the prior art, the effective filing date for the claims in the instant application is 9/30/2003.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claims 9, 12, 64, 65, 69, and 74-101 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

Regarding claims 9 and 12, the phrase "if" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim 13 recites the limitation "said angle." There is insufficient antecedent basis for this limitation in the claim.

Claim 64 recites the limitation "said gravity tank." There is insufficient antecedent basis for this limitation in the claim because claim 53, from which this claim depends, does not recite a gravity tank. Because claim 63 does recite a gravity tank, the examiner has interpreted claim 64 as depending from claim 63.

Claim 65 is indefinite because this claim depends from itself. It appears that this claim should depend from claim 64, and the examiner has interpreted it as such.

Claim 69 recites the limitation "said separate drying means." There is insufficient antecedent basis for this limitation in the claim. Specifically, there is no antecedent basis for a *separate* drying means.

The term "substantially complete" in claim 74 is a relative term which renders the claim indefinite. The term "substantially complete" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. How complete must the coating of the invention be to impart the claimed properties and meet the limitations of this claim?

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. **Claims 1-19, 21-23, 29-55, 58-60, and 66-73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hubbard et al. (WO 97/47678 A1) in view of Cuellar et al. (US 5,482,745 A).**

Hubbard teaches a method of improving adhesion between the surface of a thermoplastic polyolefin (TPO) element and a coating material subsequently applied thereto (abstract; 1:10-13; and 2:29-3:13). The method comprises: supplying an adhesion promoter (3:15-8:16 and 10:8-14); creating a mixture of the adhesion promoter and water (5:3-10); applying the mixture to one or more TPO elements via an adhesion promoter application device (i.e., spray application) (12:9-30); and drying the one or more adhesion promoter-coated substrates whereby a dried layer of the adhesion promoter is retained on the surface (13:20-21 and 14:8-11).

With respect to claims 1 and 38, Hubbard does not explicitly state that the water, with which the adhesion promoter is mixed, is de-ionized (DI) water. It is the examiner's position that it would have been obvious to one of ordinary skill in the art to modify the method of Hubbard so as to utilize, as the water with which the adhesion promoter is mixed, DI water. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of successfully reducing contamination of the adhesion promoter-water mixture by utilizing pure, DI water.

With respect to claim 1, Hubbard does not teach: providing an enclosure, the enclosure forming a protective environment for the application of the adhesion promoter-water mixture; regulating the atmosphere within the enclosure; providing the mixture to an application device located within the enclosure; or placing one or more TPO elements within the enclosure.

With respect to claim 38, Hubbard does not teach: providing an application enclosure, the enclosure forming a protective environment for the application of the adhesion promoter-water mixture; regulating the atmosphere within the application enclosure; providing the mixture to a plurality of spray nozzles located within the application enclosure; locating the TPO element within the application enclosure; applying the mixture to the TPO element via the plurality of spray nozzles; or regulating, during application of the mixture to the TPO element, one or more of a flow rate of the mixture, a discharge pattern of the plurality of spray nozzles, an angle of the plurality of spray nozzles, a distance of the plurality of spray nozzles from the TPO element, and an orientation of the TPO element.

Cuellar teaches that the spray application of a coating to an article is, conventionally, preformed by means of an apparatus having a conveyor system which introduces the substrate to an open spraying booth where a plurality of spray nozzles coat the article with a coating composition (1:9-12). The specific disclosure of Cuellar is of a closed coating chamber, having a predetermined, regulated atmosphere, in which the article to be coated is located, and the coating composition is spray-applied via a plurality of spray nozzles (2:1-45). This spray-coating arrangement more efficiently utilizes coating material by maintaining predetermined atmospheric conditions within a closed coating chamber to prevent coating material from curing and to keep it in a re-useable state (2:1-8). Further, with specific respect to claim 38, Cuellar teaches that each of the spray nozzles has a predetermined area of coverage corresponding to its distance from the article. The positions of the spray nozzles allow complete coverage of the article and minimizes the amount of coating material necessary to fully coat the article. The spray nozzles are also adjustable in a wide variety of ways to accommodate the variety of articles

which can be coated (3:39-50). Lastly, Cuellar teaches drying the coated article in a separate drying enclosure (7:42-61).

Hubbard teaches that the adhesion promoter composition may be applied by any known spray-coating technique, without limitation (12:9-30). Since Cuellar teaches such a spray-coating technique with the advantages of efficient coating application and re-use, it would have been obvious to one of ordinary skill in the art to modify the method of Hubbard so as to spray-apply the adhesion promoter composition according to the method of Cuellar. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of successfully and efficiently coating the TPO element while enabling re-use of excess coating material.

Lastly, both Hubbard and Cuellar are silent with respect to the uniformity of the coating. Consequently, the fair teaching of this combination is that the dried adhesion-promoter layer does not detrimentally effect the appearance of the subsequently applied coating. Further, since this combination otherwise teaches all of applicant's claimed coating steps, unless some essential limitation(s) is/are not recited in the claims, such is an inherent feature of the combination of Hubbard in view of Cuellar.

With respect to claim 2, Cuellar teaches at least one nozzle for the application of the coating material (see Fig. 2).

With respect to claims 3-7 and 39-43, both references are silent as to the particular values of flow rate, nozzle-substrate distance, nozzle number, and nozzle diameter. All of these parameters are result-effective variables effecting the uniformity of the applied coating and the efficiency of the overall coating process. Absent a showing of unexpected results demonstrating the criticality of the claimed values, it would have been obvious to one of ordinary skill in the art

to modify the method of Hubbard in view of Cuellar so as to optimize these result-effective variables by routine experimentation (MPEP § 2144.05(II)).

With respect to claims 8, 13, 44, and 49, while Cuellar states that nozzle angle may be adjusted (see above) and Cuellar's Fig. 2 illustrates nozzles angled at approximately 45°, the reference does not explicitly recite an angle within the claimed range. It is the examiner's position that this value, too, is a result-effective variable effecting the uniformity of the applied coating and the efficiency of the overall coating process (a nozzle must be oriented so that the spray impinges upon the surface of the substrate). Absent a showing of unexpected results demonstrating the criticality of the claimed nozzle angle, it would have been obvious to one of ordinary skill in the art to modify the method of Hubbard in view of Cuellar so as to optimize this result-effective variables by routine experimentation (MPEP § 2144.05(II)).

With respect to claims 9, 12, 46, and 48, neither Hubbard nor Cuellar explicitly state that at least one of the nozzles is oriented toward/away from the/a direction of travel. It would have been obvious to one of ordinary skill in the art modify the method of Hubbard in view of Cuellar to do so. One of ordinary skill would have been motivated to do so by the desire and expectation of ensuring coating of the leading/trailing surface(s) of the article.

With respect to claims 10 and 45, Cuellar teaches that the article is conveyed through the coating chamber (4:11-25).

With respect to claims 11 and 47, neither Hubbard nor Cuellar teach the particular linear velocity claimed. Linear velocity is a result-effective variable effecting the processing time of the overall coating process. Absent a showing of unexpected results demonstrating the criticality of the claimed linear velocity, it would have been obvious to one of ordinary skill in the art to

modify the method of Hubbard in view of Cuellar so as to optimize this result-effective variable by routine experimentation (MPEP § 2144.05(II)).

With respect to claims 14, 15, 50, and 51, Cuellar teaches cleaning the substrate prior to coating in order to remove dirt and contaminants therefrom (7:5-15). Cuellar does not explicitly teach that cleaning involves rinsing with DI water. Nevertheless, as noted above, it would have been obvious to rinse with pure, DI water, to ensure that no contaminants or residue remained on the surface after cleaning.

With respect to claims 16-18 and 52-54, Cuellar teaches adjusting the temperature of the substrate to a predetermined value, prior to coating in the coating chamber. This value is optimized for the particular coating material (7:15-30). It is the examiner's position that the fair teaching of Hubbard's working examples is that the adhesion promoter is applied at ambient temperatures (i.e., room temperature), which is inclusive of the 20-25°C range claimed. Further, it is the examiner's position that both application temperature and relative humidity are result-effective variables, effecting coating characteristics of the adhesion promoter. Absent a showing of unexpected results demonstrating the criticality of the claimed application temperature and relative humidity, it would have been obvious to one of ordinary skill in the art to modify the method of Hubbard in view of Cuellar so as to optimize these result-effective variables by routine experimentation (MPEP § 2144.05(II)).

With respect to claims 19 and 55, it is well-known to utilize metering devices, such as glassware or other volumetric or gravimetric measuring means when preparing aqueous coating compositions. Consequently, in the preparation of the adhesion promoter of Hubbard, it would

have been obvious to one of ordinary skill in the art to utilize a metering device to achieve the desired ratio of adhesion promoter to water.

With respect to claims 21-23 and 58-60, Cuellar teaches that the spray application system includes a storage tank and filtered re-circulation system (Fig. 6 and 5:62-7:41).

With respect to claims 29-31 and 66-68, Cuellar teaches that an air seal is a well-known means for sealing a coating chamber (1:23-40). Although Cuellar teaches a specific automatic door mechanism for sealing the chamber, it would have been obvious to one of ordinary skill in the art to further supplement this sealing means with another known sealing means such as the air seal described by Cuellar. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of ensuring isolation of the coating chamber from the external environment. With specific respect to claims 31 and 68, it is the examiner's position that a fan is a well-known means of generating the air flow required for an air seal.

With respect to claims 32, 33, and 69, both Hubbard and Cuellar teach drying in an oven (see Hubbard's Examples and Cuellar 7:43-61). Hubbard further teaches that the adhesion promoter is dried in an oven at a temperature of 25-200°C (14:6-11).

With respect to claims 34 and 70, neither reference teach a specific relative humidity in the oven. Again, it is the examiner's position that the relative humidity in a drying oven for drying an aqueous coating composition is a result-effective variable effecting drying time. Absent a showing of unexpected results demonstrating the criticality of the claimed relative humidity, it would have been obvious to one of ordinary skill in the art to modify the method of Hubbard in view of Cuellar so as to optimize the relative humidity in the drying oven by routine experimentation (MPEP § 2144.05(II)).

With respect to claims 35-37 and 71-73, the "pre-oven" and parameters thereof, claimed by applicant, read on a "flashing-off" step. Such a step is well-known in the coating art for allowing evaporation of solvent and reducing curing/drying time and energy. As noted above, the particular temperature and relative humidity of any drying process are result-effective variables. Absent a showing of unexpected results demonstrating the criticality of the claimed relative humidity, it would have been obvious to one of ordinary skill in the art to modify the method of Hubbard in view of Cuellar so as to optimize the temperature and relative humidity in the pre-oven oven by routine experimentation (MPEP § 2144.05(II)).

8. **Claims 20, 56, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hubbard et al. (WO 97/47678 A1) in view of Cuellar et al. (US 5,482,745 A) as applied to claims 19 and 55, respectively, above, and further in view of Browining (US 4,452,171 A).**

The combined teaching of Hubbard and Cuellar is detailed above. Neither of these references teach that a surface tension meter is adapted to analyze a wet sample of the adhesion promoter mixture, the surface tension meter communicating with the metering device to provide regulation of the amount of adhesion promoter added to water, based on the analysis.

Browning teaches that the surface tension of a coating composition may be controlled by controlling the viscosity thereof (7:28-34). Based on this teaching, it would have been obvious to monitor the surface tension of the coating composition and to adjust it as one of ordinary skill would adjust the viscosity of a coating composition: by adjusting the amount of adhesion promoter added to water.

With respect to claim 57, none of the cited references explicitly state that the water, with which the adhesion promoter is mixed, is de-ionized (DI) water. It is the examiner's position

that it would have been obvious to one of ordinary skill in the art to modify the method of Hubbard, Cuellar, and Browning so as to utilize, as the water with which the adhesion promoter is mixed, DI water. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of successfully reducing contamination of the adhesion promoter-water mixture by utilizing pure, DI water.

9. **Claims 24, 25, 61, and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hubbard et al. (WO 97/47678 A1) in view of Cuellar et al. (US 5,482,745 A) as applied to claim 1 above, and further in view of Bartow (US 5,230,739 A).**

The combined teaching of Hubbard and Cuellar is detailed above. Neither of these references teach utilizing a heat exchanger to regulate the temperature of the adhesion promoter-water mixture prior to application. Further, neither of these references teach that the adhesion promoter-water mixture is supplied from the heat exchanger to the nozzles.

Bartow teaches that, in the spray-application of a coating composition, heat exchangers are used to maintain the temperature and, thereby, the viscosity of the coating composition (1:64-2:6).

It would have been obvious to one of ordinary skill in the art to modify the method of Hubbard in view of Cuellar so as to utilize a heat exchanger to regulate the temperature of the adhesion promoter-water mixture, as suggested by Bartow. One of ordinary skill would have been motivated to do so by the desire and expectation of maintaining the viscosity and, consequently, favorable coating characteristics thereof.

With specific respect to claims 25 and 62, locating the heat exchanger immediately before the application device (nozzles) ensures the least fluctuation in temperature before

application. Consequently, it would have been obvious to one of ordinary skill in the art to modify the method of Hubbard in view of Cuellar to do so.

10. **Claims 26-28 and 63-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hubbard et al. (WO 97/47678 A1), Cuellar et al. (US 5,482,745 A), and Bartow (US 5,230,739 A), as applied to claim 25 above, and further in view of Kaneski et al. (US 5,575,560 A).**

The combined teaching of Hubbard, Cuellar, and Bartow is detailed above. None of these references teach that the adhesion promoter-water mixture is supplied from the heat exchanger to a gravity tank or that the gravity tank supplies a supply header located within the enclosure.

With reference Cuellar's Fig. 6, supply tote **75** feeds coating material into circulation tank **30**, which later supplies the application system (nozzles). While, according to Cuellar, transfer from tote **75** to tank **30** is achieved by means of a pump, Kaneski illustrates a coating composition supply system in which transfer from the tote **14** to the circulation tank **12** is achieved by gravity (3:25-30).

It would have been obvious to one of ordinary skill in the art to modify the method of Hubbard, Cuellar, and Bartow so as to substitute, for the pump-driven supply of Cuellar, the gravity supply of Kaneski. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of simplifying and reducing the cost of the supply system by eliminating the pump of Cuellar.

Further, since applicant has not explicitly defined the term "gravity tank," it is the examiner's position that both the tote and circulation tank of Kaneski read on a gravity tank — one is emptied by gravity and the other is filled by gravity.

With respect to claims 27 and 28, both Kaneski and Cuellar teach that the nozzles are supplied from the circulation tank, which reads, as noted above, on a "gravity tank." It is the examiner's position that the lower, elongated portions of nozzle **24**, illustrated in Cuellar's Fig. 5, reads on a supply header.

With specific respect to claims 26 and 63, according to the disclosure of Bartow, the location of the heat exchanger does not appear to be critical and location before or after the gravity tank would have been at the discretion of the artisan, guided with appropriate regard to the desire temperature and viscosity of the coating composition.

11. **Claims 74-88, 90-92, and 95-101 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hubbard et al. (WO 97/47678 A1) in view of Cuellar et al. (US 5,482,745 A) and Mashima et al. (WO 97/31694 A1, reference made to US 5,919,288 A as the English-language equivalent).**

The teachings of Hubbard and Cuellar, detailed above, are wholly incorporated into the rejections set-forth below. As noted above, and also with respect to claim 90, it would have been obvious to one of ordinary skill in the art to modify the method of Hubbard so as to utilize, as the water, DI water. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of successfully reducing contamination of the adhesion promoter-water mixture by utilizing pure, DI water. Further, it would have been obvious to one of ordinary skill in the art to modify the method of Hubbard so as to spray-apply the adhesion promoter

composition according to the method of Cuellar. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of successfully and efficiently coating the TPO element while enabling re-use of excess coating material.

With respect to claim 74, neither of these references teach: providing a gravity tank for receiving a supply of the adhesion promoter-water mixture from the mixture storage tank; providing at least one supply header for receiving, via gravity from the gravity tank, an amount of the adhesion promoter-water mixture; or that, due to the application of a substantially complete coating of the TPO element with the adhesion promoter-water mixture and a reduction in the amount of foaming and splashing of the mixture that occurs during the application, the presence of the dried layer of adhesion promoter does not have a detrimental effect on the appearance of the subsequently applied coating material.

As noted above, Cuellar teaches a circulation tank that is supplied from a paint tote. Mashima teaches a spray coating method in which a circulation tank **6** supplies a supply header (see Fig. 1). Although not explicitly stated, it is the examiner's position that this transfer is via gravity since it is achieved without the use of pumps or other mechanical means. Further, Mashima teaches the incorporation of an anti-foamer in the coating composition to suppress foaming that interferes with materials recovery and recycling (1:1-4:20).

It would have been obvious to one of ordinary skill in the art to modify the method of Hubbard in view of Cuellar so as to feed the supply header via gravity from the circulation tank. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of successfully delivering the adhesion promoter-water mixture to the application device. Additionally, one of ordinary skill in the art would have been motivated by the desire and

expectation of simplifying and reducing the cost of the supply system by eliminating the need for a pump for transfer between the circulating tank and the nozzles.

It would have been further obvious to one of ordinary skill in the art to incorporate an anti-foaming agent into the adhesion promoter-water mixture in order to suppress foaming in order to facilitate materials recycling and recovery.

As noted above, Cuellar teaches adjusting the temperature of the substrate to a predetermined value, prior to coating in the coating chamber. This value is optimized for the particular coating material (7:15-30). it is the examiner's position that this is inclusive of either heating the substrate when too cold or cooling the substrate when too hot. Further, although none of Hubbard, Cuellar, or Mashima state that at least one of the nozzles is oriented toward/away from the/a direction of travel, it would have been obvious to one of ordinary skill in the art modify the method of Hubbard in view of Cuellar and Mashima to do so. One of ordinary skill would have been motivated to do so by the desire and expectation of ensuring coating of the leading/trailing surface(s) of the article. Cuellar teaches that the article is conveyed through the coating chamber on a conveyor (4:11-25).

Lastly, Hubbard, Cuellar, and Mashima are silent with respect to the uniformity of the coating. Consequently, the fair teaching of this combination is that the dried adhesion-promoter layer does not detrimentally effect the appearance of the subsequently applied coating. Further, since this combination otherwise teaches all of applicant's claimed coating steps, unless some essential limitation(s) is/are not recited in the claims, such is an inherent feature of the combination of Hubbard, Cuellar, and Mashima.

With respect to claims 75-79, all of the cited references are silent as to the particular values of flow rate, nozzle-substrate distance, nozzle number, and nozzle diameter, all of these parameters are result-effective variables effecting the uniformity of the applied coating and the efficiency of the overall coating process. Absent a showing of unexpected results demonstrating the criticality of the claimed values, it would have been obvious to one of ordinary skill in the art to modify the method of Hubbard in view of Cuellar and Mashima so as to optimize such result-effective variables by routine experimentation (MPEP § 2144.05(II)).

With respect to claim 80, while Cuellar states that nozzle angle may be adjusted (see above) and Cuellar's Fig. 2 illustrates nozzles angled at approximately 45°, the reference does not explicitly recite an angle within the claimed range. It is the examiner's position that this value, too, is a result-effective variable effecting the uniformity of the applied coating and the efficiency of the overall coating process (a nozzle must be oriented so that the spray impinges upon the surface of the substrate). Absent a showing of unexpected results demonstrating the criticality of the claimed nozzle angle, it would have been obvious to one of ordinary skill in the art to modify the method of Hubbard in view of Cuellar and Mashima so as to optimize this result-effective variable by routine experimentation (MPEP § 2144.05(II)).

With respect to claim 81, none of Hubbard, Cuellar, or Mashima teach the particular linear velocity claimed. Linear velocity is a result-effective variable effecting the time of the overall coating process. Absent a showing of unexpected results demonstrating the criticality of the claimed linear velocity, it would have been obvious to one of ordinary skill in the art to modify the method of Hubbard in view of Cuellar and Mashima so as to optimize this result-effective variable by routine experimentation (MPEP § 2144.05(II)).

With respect to claims 82 and 83, Cuellar illustrates a substrate of a complex, three-dimensional shape. It is the examiner's position that at least one surface of the substrate is angled between about 5-20° toward a direction of travel of the conveyor.

With respect to claims 84 and 85, Cuellar teaches cleaning the substrate prior to coating in order to remove dirt and contaminants therefrom (7:5-15). Cuellar does not explicitly teach that cleaning involves rinsing with DI water. Nevertheless, as noted above, it would have been obvious to do so to ensure that no contaminants or residue remained on the surface after cleaning.

With respect to claim 86, it is the examiner's position that a temperature of about 20-25°C reads on room temperature. The TPO element must, at some point, be at room temperature; if not before the coating process while in storage, then after the coating process while in use.

With respect to claim 87, it is the examiner's position that relative humidity is a result-effective variable, effecting coating characteristics of the adhesion promoter. Absent a showing of unexpected results demonstrating the criticality of the claimed linear velocity, it would have been obvious to one of ordinary skill in the art to modify the method of Hubbard, Cuellar, and Mashima so as to optimize relative humidity by routine experimentation (MPEP § 2144.05(II)).

With respect to claim 88, it is well-known to utilize metering devices, such as glassware or other volumetric or gravimetric measuring means when preparing aqueous coating compositions. Consequently, in the preparation of the adhesion promoter of Hubbard, it would have been obvious to one of ordinary skill in the art to utilize a metering device to achieve the desired ratio of adhesion promoter to water.

With respect to claims 91 and 92, both Cuellar and Mashima teach filtering and re-circulating the adhesion promoter-water mixture (see above).

With respect to claims 95 and 96, Cuellar teaches that an air seal is a well-known means for sealing a coating chamber (1:23-40). Although Cuellar teaches a specific automatic door mechanism for sealing the chamber, it would have been obvious to one of ordinary skill in the art to further supplement this sealing means with another known sealing means such as the air seal described by Cuellar. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of ensuring isolation of the coating chamber from the external environment. With specific respect to claim 31, it is the examiner's position that a fan is a well-known means of generating the air flow required for an air seal.

With respect to claim 97, both Hubbard and Cuellar teach drying in an oven (see Hubbard's Examples and Cuellar 7:43-61). Hubbard further teaches that the adhesion promoter is dried in an oven at a temperature of 25-200°C (14:6-11).

With respect to claim 98, none of the cited references teach a specific relative humidity in the oven. Again, it is the examiner's position that the relative humidity in a drying oven for drying an aqueous coating composition is a result-effective variable effecting drying time. Absent a showing of unexpected results demonstrating the criticality of the claimed relative humidity, it would have been obvious to one of ordinary skill in the art to modify the method of Hubbard in view of Cuellar and Mashima so as to optimize the relative humidity in the drying oven by routine experimentation (MPEP § 2144.05(II)).

With respect to claims 99-101, the "pre-oven" and parameters thereof, claimed by applicant, read on a "flashing-off" step. Such a step is well-known in the coating art for allowing

evaporation of solvent and reducing curing/drying time and energy. As noted above, the particular temperature and relative humidity of any drying process are result-effective variables. Absent a showing of unexpected results demonstrating the criticality of the claimed relative humidity, it would have been obvious to one of ordinary skill in the art to modify the method of Hubbard in view of Cuellar and Mashima so as to optimize the temperature and relative humidity in the pre-oven oven by routine experimentation (MPEP § 2144.05(II)).

12. **Claim 89 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hubbard et al. (WO 97/47678 A1) in view of Cuellar et al. (US 5,482,745 A) and Mashima et al. (US 5,919,288 A) as applied to claim 88 above, and further in view of Browning (US 4,452,171 A).**

The combined teaching of Hubbard, Cuellar, and Mashima is detailed above. None of these references teach that a surface tension meter is adapted to analyze a wet sample of the adhesion promoter mixture, the surface tension meter communicating with the metering device to provide regulation of the amount of adhesion promoter added to water, based on the analysis.

Browning teaches that the surface tension of a coating composition may be controlled by controlling the viscosity thereof (7:28-34). Based on this teaching, it would have been obvious to monitor the surface tension of the coating composition and to adjust it as one of ordinary skill would adjust the viscosity of a coating composition: by adjusting the amount of adhesion promoter added to water.

13. **Claims 93 and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hubbard et al. (WO 97/47678 A1) in view of Cuellar et al. (US 5,482,745 A) and Mashima**

et al. (US 5,919,288 A), as applied to claim 74 above, and further in view of Bartow (US 5,230,739 A).

The combined teaching of Hubbard, Cuellar, and Mashima is detailed above. None of these references teach utilizing a heat exchanger to regulate the temperature of the adhesion promoter-water mixture prior to application. Further, neither of these references teach that the adhesion promoter-water mixture is supplied from the heat exchanger to the nozzles.

Bartow teaches that, in the spray-application of coating composition, heat exchangers are sued to maintain the temperature and, thereby, the viscosity of the coating composition (1:64-2:6).

It would have been obvious to one of ordinary skill in the art to modify the method of Hubbard in view of Cuellar and Mashima so as to utilize a heat exchanger to regulate the temperature of the adhesion promoter-water mixture, as suggested by Bartow. One of ordinary skill would have been motivated to do so by the desire and expectation of maintaining the viscosity and, consequently, favorable coating characteristics thereof.

With specific respect to claim 94, the location of the heat exchanger does not appear to be critical and location before or after the gravity tank would have been at the discretion of the artisan, guided with appropriate regard to the desire temperature and viscosity of the coating composition.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ankrett (US 4,600,608 A) teaches a surface-coating apparatus and method in which a substrate is spray-coated in an enclosure with a regulated atmosphere.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William P. Fletcher III whose telephone number is (571) 272-1419. The examiner can normally be reached on Monday through Friday, 9 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P. Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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WPF 4/5/2004

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